Milking History for All It's Worth:
The Archaeology of Nineteenth and
Early Twentieth Dairy Farms in Delaware

by

David J. Grettler
University of Delaware
Center for Archaeological Research
Newark, DE 19716

Paper presented at the 1992 Annual Meeting of the Council for Northeast Historical Archaeology (CNEHA) at Glenn Falls, New York.

MILK 2.WS
Copy sent to requestors

Milking History for All It's Worth: The Archaeology of Nineteenth and Early Twentieth Dairy Farms in Delaware

I. Introduction

Today I want to summarize for you the three major archaeological changes in farm life brought by commercial dairy operations in nineteenth and early twentieth century Delaware. Similar changes affected outbuilding construction, farmstead layout, and trash disposal patterns throughout New England and the Mid-Atlantic regions. First, I want to show you how to recognize some of the archaeological and material culture evidence these changes. Second, I want to show you how we have "milked" them by interpreting these farms within the context of agricultural reform and the larger social and economic history of the Mid-Atlantic region (Grettler 1990; 1992).

I will focus on farmers who tried to produce commercial quantities of milk, butter, and cheese. The scale of production varied enormously--from housewives trying to produce a few extra pounds of butter to commercial dairy farms producing thousands of pounds of milk daily. Whatever the scale, the goal of dairying was the same: producing a cash crop from cows (Jensen 1986). And squeezing money from cows--on whatever scale--entailed some changes in material life that we can see in the ground. While these archaeological changes are most apparent on larger, more specialized farms, they occurred at all levels of dairy production and can be applied to just about any farm. According to the 1850 agricultural census, a herd of about six milk cows was the threshold for serious dairying in Delaware.

Farms with 6-10 milk cows were medium-sized operations. Any farm with more than 10 milk cows was a big dairy farm. The biggest farms in Delaware in 1850 had between 60 and 70 head of cattle. Even the largest farms continued to grow corn, hay and other crops as part of a more generalized strategy.

What I want to do now is to summarize the dairy history of Delaware and to identify three major archaeological changes brought by commercial dairying. We at the University of Delaware Center for Archaeological Research first saw these changes at five nineteenth and early twentieth century owner- and tenant-occupied farms in Delaware (Grettler et al. 1991). We recently completed data recovery excavations at these farms for the Delaware Department of Transportation (Grettler et al. [1993]; Jamison et al. [1993]; Scholl et al. 1992).

II. Milking History of Delaware

Cattle had always been a preferred livestock in Delaware and the Middle Atlantic. Tough, tasty, self-sufficient--cows could even walk themselves to market. Most rural and even urban families had access to least one milk cow for home use. Two cows produced enough milk and butter--about 60 pounds--for even the largest families (Michel 1985:28). Anyone with more than two milk cows was almost certainly selling--or trading--some of their surplus milk and butter.

Two key events shaped the dairy history of Delaware. Both events were improvements in transportation. Improved transportation meant new markets--especially urban markets where dairy goods commanded top dollar. Delaware's proximity to

Philadelphia, New York, and Baltimore--the largest cities in the country--was another important factor (c.f. Lindstrom 1971). Smaller towns were just as important and could be as profitable.

The first revolution in Delaware's dairy history occurred in 1854 when the Delaware railroad was completed. The railroad ran the entire length of Delaware and sparked an economic boom that revolutionized agriculture. Rail transport brought cites as far away as Pittsburgh within reach of Delaware farmers. Milk, peaches, tomatoes, butter and other perishable goods became the most profitable sectors of agriculture. Even the scores of small towns that sprang up along the Delaware railroad provided additional markets for dairy products and other goods.

The second revolution in dairying occurred in 1924 when Route 13--one of the first dual lane highways in the country--was completed. Route 13 also ran then entire length of Delaware, paralleling the Delaware Railroad. Even more so than the railroad, Route 13 and motorized transportation opened up whole new markets for Delaware farmers. As hamlets, towns and cities grew throughout Delaware and southeastern Pennsylvania, fewer people owned cows and more people were willing--and able--to purchase dairy products.

Fluid milk shipped in cans such as these from the Woodville site were a key factor in this second revolution. The eighteenth and early nineteenth century equivalent were butter pots. By 1924, however, transportation costs had finally dropped to a point where fluid milk could be shipped from even the most remote farms. Larger dairies also began to deliver milk and butter

directly to consumers and the precursors of the huge dairy mini-markets were born. Larger markets and more competition between dairies also lowered prices. Lower prices, especially for fluid milk, increased demand and kept the whole ball rolling through the 1950s. Cheese was never as important in Delaware as New England or upstate New York because better transportation never forced farmers to ship more processed--and thus less profitable--products.

These two revolutions in transportation brought larger scale, commercial production of milk and butter to most parts of Delaware. I can't emphasize the importance of transportation changes in dairying history enough. Improved transportation meant not only more effective ways to transport perishables, but also new markets filled with new customers. The largest dairy farms were inevitably located near good transportation routes, especially roads. And as new highway construction tends to following existing roads, we have been digging a large number of farms with significant dairying components.

The most commercialized farms also invariably belonged to landowners from established families who had the capital and manpower to specialize. The Buchanan family of central Delaware were one such established family able to exploit new market opportunities (Scholl et al. 1992). The Buchanans lived at the Buchanan-Savin Farm, a second quarter of the nineteenth century farm only one and a half miles from the new Delaware Railroad and less than a mile from the growing town of Smyrna. For the Buchanans and other Delaware farmers, dairying could be extremely profitable. Even as early as 1850, some farms in northern

Delaware near Wilmington and Philadelphia were producing over 1600 pounds of butter per year (Michel 1985:30). This amount of butter--50 times what a family of four could consume in a year--was worth $500, roughly half the purchase price of an entire farm in southern Delaware.

The everyday reality of dairying, however, was much different than these grand sweeping changes. Dairying certainly wasn't for everyone and no two dairy farms were the same. Few farms could afford to specialize completely. The two most important limiting factors on any farm were money and labor (c.f. Barron 1984). These two factors limited every farmer's ability to exploit new opportunities. Every farmer who wanted to increase milk production faced two problems. First, how do I pay for these cows and all of their baggage, especially barns, hay lofts, and other outbuildings. Second, how can I feed them so that they could produce milk all year? How do I feed my calves for three years until they are old enough to breed? Cows weren't just expensive, they were damned hard work. Watering, feeding, mucking, milking, cleaning--all these activities had to be done everyday.

Once you get a sense of these two inescapable factors, you can begin to understand the solutions--compromises--that farmers made. As with any other kind of agricultural improvement, change was predicated on very hard and very personal decisions about your finances, your farm, your prospects for the future. The results of some of these decisions leave traces in the ground.

III. Milking Archaeology

It is this process of specialization--of agricultural improvement--that we can see evidence of in the ground. So far, we have been able to identify three major improvements related to dairying in Delaware. First, new outbuildings. Second, new farmstead layouts. And third, new activity areas and trash disposal patterns.

A. Outbuilding Construction

The first and most obvious archaeological feature of dairy farms is the size and variety of outbuildings. The Buchanan-Savin Farm shows the variety of outbuildings on early twentieth century dairy farms. The Buchanan-Savin farm became an even larger dairy farm in the 1920s after the new Route 13 nearly bisected the farm. Thomas Moffitt, the owner of the farm, chose to exploit his transportation windfall and invested the cash he got for the right-of-way into eight modern concrete block dairy barns, milking sheds, silos, and machinery sheds.

From silos to ice houses, cows meant more outbuildings. Of all these structures, the dairy barn was the most important. The dairy barns that we have found have been pretty easy to identify because of their enormous size. All of the dairy barns that we have seen have been between 60' and 80' long and 30'-40' wide.

These dairy barns are much larger than any other barns we have ever seen. The primary advantage of such large buildings was that they held more cows and more hay. More cows and more hay meant that the cows were easier to feed and could keep each other warm in the winter. Warm, sheltered cows ate less, and

more importantly, spent less energy trying to stay warm and could produce more milk. Any dolt could feed his cow during the spring and summer, but not everyone could keep those same cows producing high quality milk all year round. Especially in the winter when milk was scarcest and prices highest. Farmers who could keep producing milk and butter year round made more money--especially during the winter when little other cash was coming in. "COMFORTABLE, CONTENTED ANIMALS" the editor of Farm Knowledge reminded readers in 1919, "DO THE BEST WORK, GIVE THE MOST MILK...AND RETURN THE LARGEST PROFITS" (Seymour 1919:345). Cold, unhappy animals, reformers railed, starved both themselves and their owners.

A second distinguishing characteristic of these large dairy barns was the presence of concrete floors and clearly defined bays. These bays kept cows separated and made them easier to handle. Concrete floors were more sanitary and helped farmers collect manure. Especially urine where 40% of the fertilizing power of manure was held (Seymour 1919:45). Separate lofts for hay could be equipped with special hay transporting systems that allowed one man to do the work of a dozen. Here's the remains of the main workings of one of these hay carriers from the C. Kimmey Tenant Farm.

B. Farmstead Layout

Not only did you have to have a lot of buildings, you had to put them in the right spots. The second major archaeological change with dairying in Delaware was farmstead layout. The "right" spot for these new outbuildings and activities varied

from farm to farm, but we have seen three trends in farmstead layout related to dairying. First, dairy outbuildings are usually located near a water supply, usually either a well or cistern. Dairy cows drink nearly twice the water as other cows and lots of water is needed to clean utensils, milk cans and other implements.

Second, because dairy farms literally run on water, all of the dairy farms that we have looked at have had livestock wells located near major outbuildings such as this well at the Moore-Taylor site. Most farms also had secondary storage tanks and cisterns to handle peak demand. These extra wells and storage systems also tended to be located near the outbuildings they served. Interpreting the deposits of these multiple wells, however, demands some of the special techniques that George Miller just discussed.

The third trend in farmstead layout is that dairy barns and related activities tend to be located well away from other buildings, especially stables and hog pens. Nineteenth and twentieth century dairying manuals cautioned farmers to keep their cows as far from the house and other animals as possible for sanitary reasons. I am not sure how concerned Delaware farmers were with sanitation--the placement of dairy barns along the outer edges of barnyards may simply have resulted from them being the last outbuildings constructed.

C. Activity Areas and Trash Disposal Patterns

The third major archaeological change brought by commercial dairying were changes in activity areas and trash disposal

patterns. These two changes hinged on one thing--manure. Wonderful manure. Manure was wonderful because it was great fertilizer, free, and plentiful. Actually, manure was very plentiful. The average dairy cow produces 2.5 times its weight in manure every year, nearly twice as much manure as a horse or any other animal (Seymour 1919:45, 74). The old joke about whether it would be easier to move the manure pile or the barn wasn't always so funny.

The best thing about manure was that it was the perfect fertilizer for the hay and silage you needed to feed your cows. Scientific farmers knew that "MANURE HAS BEEN THE FOUNDATION OF SUCCESSFUL FARMING SINCE THE WORLD BEGAN AND WILL BE 'TILL ITS END" (Seymour 1919: 84). These scientific farmers even claimed to able to judge an entire dairy farm by the condition of a single cow's rear end. A clean rear meant a clean farm--cows, they claimed, are only as clean as their master. No odor of manure meant that it was collected daily and stored where it wouldn't ferment and lose its potency as fertilizer.

All of this manure created two key archaeological patterns. First, collecting and storing manure left huge concentrations of phosphates in the soil that we can identify through systematic soil chemical analyses. All of the dairy farms that we have looked at have had very high concentrations of phosphates from animal wastes. These high concentrations have confirmed the use of different outbuildings to house animals. High concentrations have also identified animal pens and related activity areas that left no other traces in the ground (c.f. Custer 1986).

The second archaeological pattern from manure management has

proven to be much more important in creating the archaeological record. As household garbage was usually composted with manure, extensive manuring has surrounded most dairy farms with huge, low density scatters of plow zone artifacts. Domestic debris that was once deposited in wells and trash pits, was now being spread over hundreds of acres. Mechanical manure spreaders were a major factor in this off-site deposition of artifacts. With nineteenth and twentieth century domestic debris in almost every field in Delaware, site identification has become less a matter of finding artifacts than identifying significant concentrations amid thousands of noisy, background artifacts.

Because household debris, including ceramics, was collected and spread with manure, we also tend to find few large pieces of ceramics. Almost all of the ceramics we have recovered from these five sites have been small, poorly preserved, and from disturbed plow zone contexts. Except for the artifacts in a few well preserved contexts such as privies and wells, we have had to routinely do minimum vessel analyses with less than 5% of any vessel represented. These small sherds have meant large residuals and generally poorer ceramic data.

The use of large, off-site trash dumps have also affected the archaeological record. The same tractors that pull manure wagons also make hauling trash easy. We have found 19th and 20th century farms with trash dumps more than a quarter of a mile from the house--well beyond even the most liberal site limits.

We haven't solved all of these problems completely, but working on dairy farms has taught us to think very hard about we

are finding. And not finding. We are certainly not recovering all of material assemblage of any farm. And with these later 19th and 20th century farms, we probably aren't getting as much as we do on earlier sites where off-site trash disposal and manuring was not as common.

IV. Conclusion

"Milking" history is the process of reading the results of agricultural change in the ground. And recognizing that those changes are the result of personal, individual decisions. We may even get a peak at motives, especially by appreciating the social, economic, and environmental limits of agricultural reform. Three key changes related to dairying--outbuilding construction, farmstead layout, and trash disposal--are particularly visible in the archaeological record.

We, as archaeologists, can use these physical remains to reconstruct some of what went through these farmer's minds. Here's how to milk history--we know how agriculture changed and can see some of the results in the ground. What connects the two are the decisions that individual farmers made--those hard, personal decisions about outbuildings, wells, manuring, machinery. In short, we can reconstruct the social and economic landscape of dairying.

No site, of course, shows all of these changes equally. Very few farms could afford every improvement. Most sites are a mosaic of improved and "unimproved" features. Outbuildings and activity areas were re-used, adapted, served multiple purposes. Even these "failures" are reform are important because they

highlight the most important elements of change. Even sites only peripherally involved in dairying--especially tenant sites--have something to say. If we listen. Like Thomas Moffit who found that the new Route 13 changed local drainage patterns and flooded his dairy farm every time it rained, we're up to our necks in milking history.

BIBLIOGRAPHY

Custer, Jay F., Ellis C. Coleman, Wade P. Catts, and Kevin W. Cunningham
1986 Soil Chemistry and Historical Archaeological Site Activity Areas: A Test Case from Northern Delaware. **Historical Archaeology** 20(2):89-94.

Grettler, David J.
1990 "The Landscape of Reform: Society, Environment, and Agricultural Reform in Central Delaware, 1780-1840." Unpublished Ph.D. dissertation, Department of History, University of Delaware, Newark.

Grettler, David J.
1992 Farmer Snug and Farmer Slack: The Archaeology of Agricultural Reform in Central Delaware. Paper presented at the 1992 Annual Meeting of the Society for Historical Archaeology, Kingston, Jamaica.

Grettler, David J., David C. Bachman, Jay F. Custer, and JoAnn Jamison
1991 **Phase II Archaeological Survey of All Historic Sites in the Early Action Segment of The State Route 1 Relief Route, Delaware.** DelDOT Archaeological Series No. 87.

Grettler, David J., George L. Miller, Wade P. Catts, Angela Hoseth, and Jay H. Hodny
[1993] **Marginal Farms on the Edge of Town: Data Recovery Investigations of the Moore-Taylor, Benjamin Wynn Tenancy (lewis-E), and H. Wilson-Lewis Farmsteads, Kent County, Delaware.** DelDOT Archaeological Series (to be assigned).

Herman, Bernard L.
1987 **Architecture and Rural Life in Central Delaware 1700-1900.** University of Tennessee Press, Knoxville.

Jamison, JoAnn E., Jack Kraft, Brenda Montgomery, Erin Mical, Rebecca Tinsman, Karen Iplenski, and Keith Doms

[1993] **The Archaeology of Agricultural Development In Philadelphia's Hinterland: Final Excavations at the C. Kimmey Tenant Farm Site, Kent County, Delaware.** DelDOT Archaeology Series (to be assigned).

Jensen, Joan
1986 **Loosening the Bonds: Mid-Atlantic Farm Women 1750-1850.** Yale University Press, New Haven.

Lindstrom, Diane
1973 **Economic Development in the Philadelphia Region 1810-1850.** Columbia University Press, New York.

Michel, Jack
1985 The Regional Organization of Delaware Agriculture, 1849. Manuscript in possession of University of Delaware Center for Archaeological Research, Newark.

Scholl, Michael D., Angela Hoseth, and David J. Grettler
1992 **Transportation and Agricultural Changes in Blackbird Hundred: Final Archaeological Investigations at the Buchanan-Savin farmstead (7NC-J-175), Green Spring, New Castle County, Delaware.** Delaware Department of Transportation Series No. (in press).

Seymour,
1919 **Farm Knowledge**